

Renewable Power Update

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National Renewable Energy Laboratory
Federal Energy Management Program



Federal Utility Partnership Working Group Meeting
Fall 2002



Overview

- Renewable Energy Policy Update
 - Energy Bills and EO13123
- Renewable Power Purchasing 101
- Wind Information



Legislation Update

- No energy legislation this year
- Renewable provisions in energy bills considered:
 - Senate bill - Federal requirement of 7.5% renewables by 2010
 - House bill – No federal provision
 - Both bills – Wind Production Tax Credit extension through 2006 (currently to 2003)



Executive Order 13123

- Issued June 1999
- Section 204 - Expand use of renewable energy
 - “**Renewable energy**” means energy produced by solar, wind, geothermal, and biomass power
 - Includes passive design
- Section 404c - Electricity Use
 - Include renewable power provisions in electricity RFPs
 - Can use energy efficiency savings to pay premium



Executive Order 13123

- Section 503 – Develop renewable energy goal
 - 2.5% of electricity from new renewables by 2005
 - Federal New Renewable Definition = after 1990
 - Develop standards low impact hydro
 - Credit towards EE goals



E.O. 13123 Web Sites

- E.O.13123 Text
<http://www.eren.doe.gov/femp/resources/exec13123.html>
- Renewable Goal Guidance
<http://www.eren.doe.gov/femp/resources/renewableguide.html>
- Guidance on Counting Renewables Toward EE, GHG and Renewables Goals
<http://www.eren.doe.gov/femp/resources/countguide.html>



Approaches for Meeting Renewable Goal



Projects

*Low energy
design
or on-site
power generation*

Renewable Power Purchases



Facilitated Projects

*Renewable power
production on
Federal lands*

RENEWABLE PROJECTS



Projects include renewable technologies that the agencies own:

➤ **On-site electricity generation**

➤ **Photovoltaic**

➤ **Wind**

➤ **Biomass**

➤ **Geothermal**



➤ **Passive Solar design in buildings**

➤ **Solar water heating and air heating**

➤ **Geothermal heating and cooling**

"Treasure the  Experience"
tampa

Facilitated Projects

Think “BIG” grid connected projects

- Includes projects on Federal land where the agency assisted in some way (such as with the siting)
- Also Renewable Energy used by clients of Federal agency (such as public housing)
- Facilitated projects offer great potential for large scale deployment
- National Energy Policy encourages increased development of Renewables on Federal lands



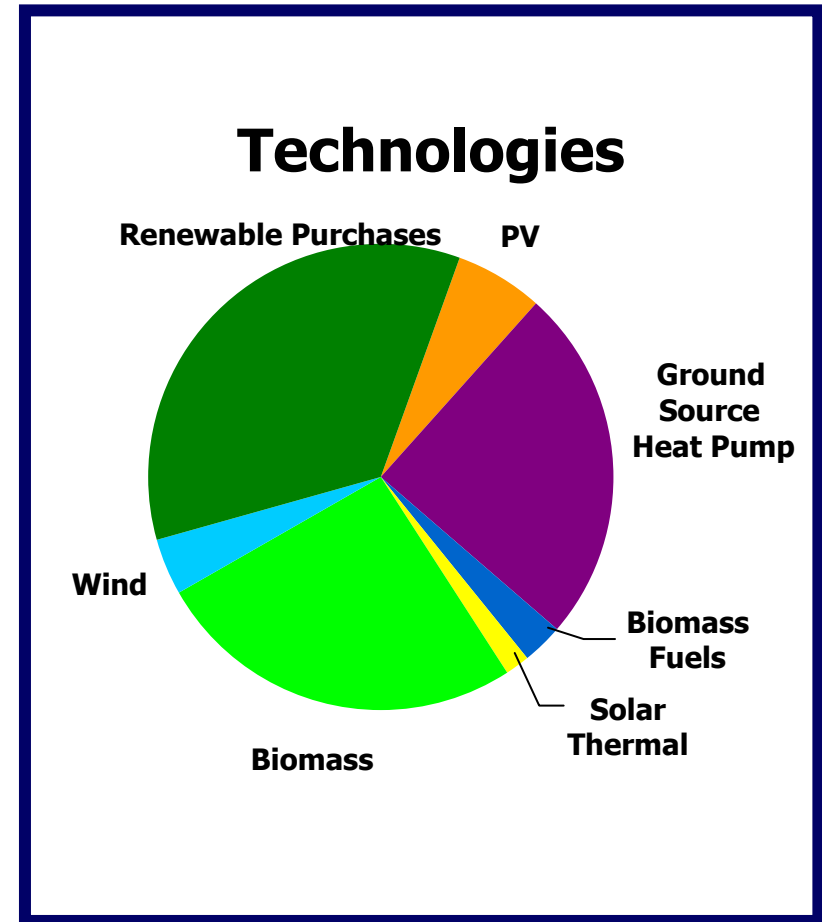
Progress Towards Meeting Renewable Goal

2.5% Goal = 1384 GWh (equals ~500 MW of wind at 31% Capacity Factor)

June 2000	173 GWh
<u>Current (8/29/02):</u>	<u>362 GWh</u>
To Go:	1,022 GWh

Federal Renewable Use

Solar Thermal	6.5 GWh
Biomass	92.5 GWh
Wind	14.1 GWh
Renewable Power Purchases	142.0 GWh
Photovoltaics (PV)	22.2 GWh
Ground Source Heat Pump	88.8 GWh
Biomass Fuels	10.4 GWh
<hr/>	
Total	376.5 GWh



Where is the Growth?

- Renewable Power Purchases – 34 GWh in Washington DC alone
- Ground Source Heat Pumps – 17 GWh
- Photovoltaics – 11 GWh
- On-Site Wind – 2.5 GWh
- Solar Thermal – 2 GWh



Renewable Project Assistance

- Assists Agencies with design and implementation of renewable projects at Federal sites
- Allows agencies to access the specialized expertise at the National Labs
- Call for Projects
- 'Ad hoc' funding



Renewable Project Assistance

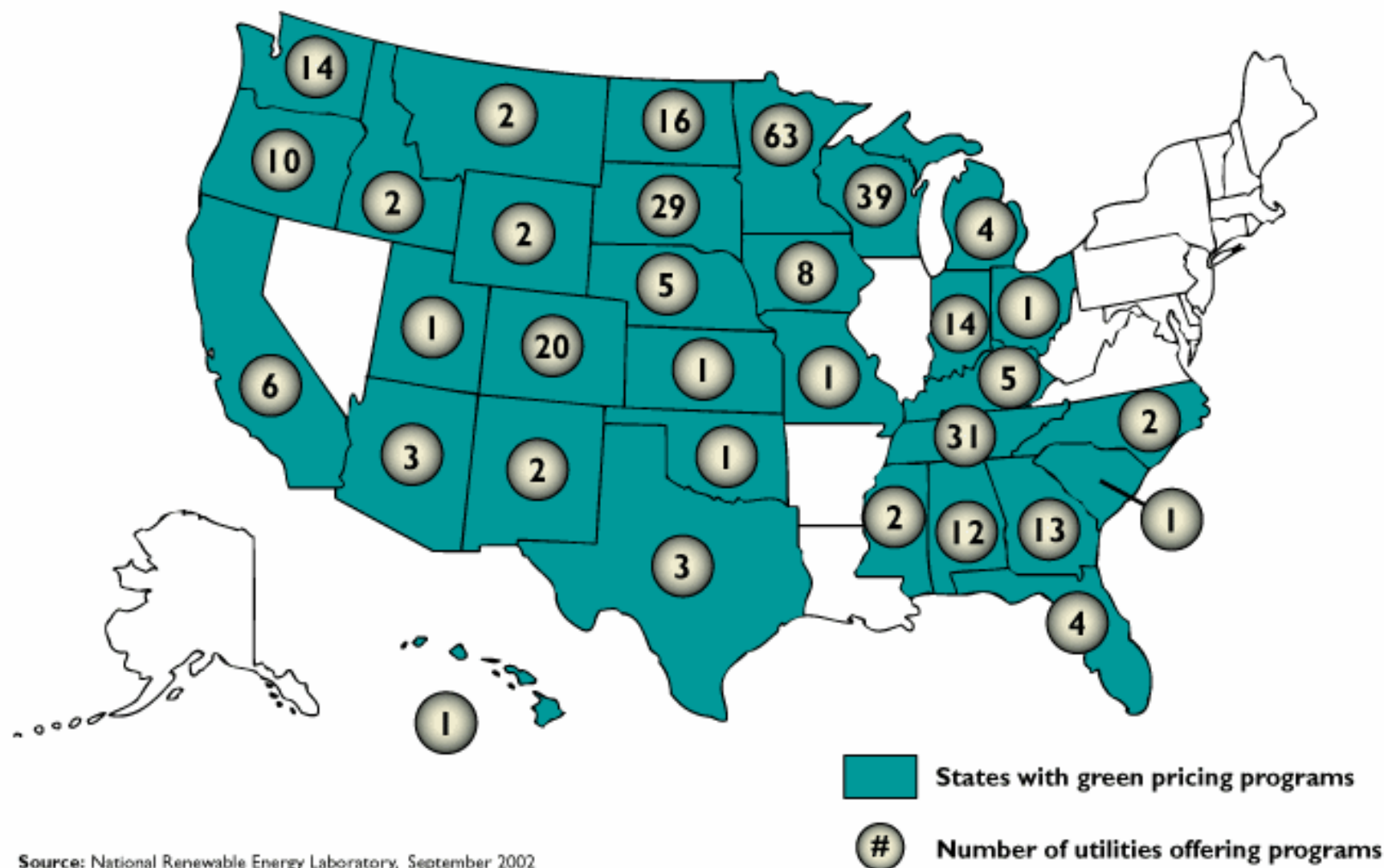
- Anne Crawley, FEMP Renewable Purchasing Program Mgr
202-586-1505, Anne.Crawley@hq.doe.gov
- Nancy Carlisle, National Renewable Energy Laboratory (NREL)
303-384-7509, nancy_carlisle@nrel.gov



Renewable Power Purchasing Options

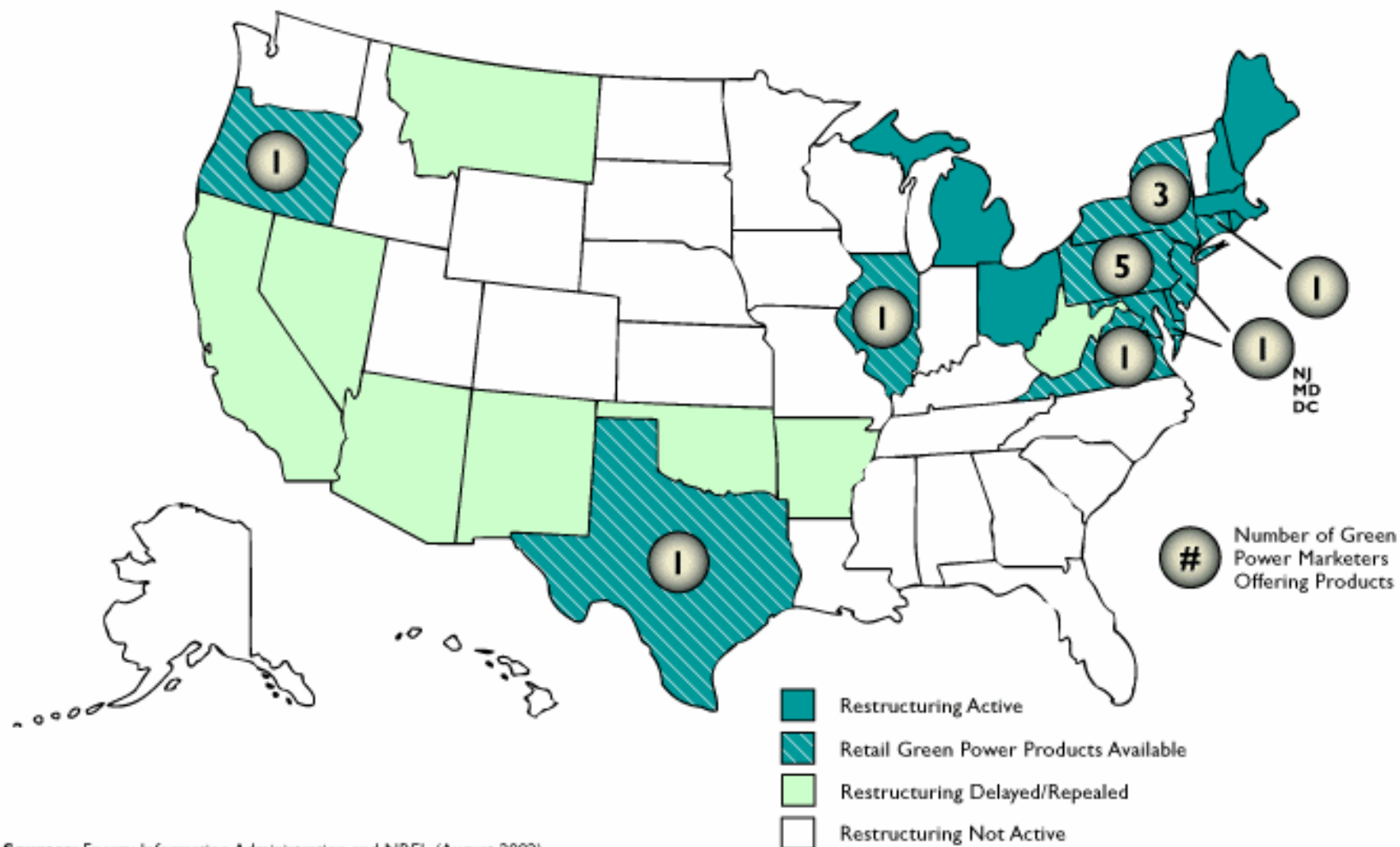
- Regulated Utility Green Pricing
- Competitive Electricity Market
- Tradable Renewable Credits (TRC)
 - Also referred to as Renewable Energy Credits (REC), Green Tags, Green Energy Certificates, etc

Utility Green Pricing Activities



Source: National Renewable Energy Laboratory, September 2002

Green Power Marketing Activity in Competitive Electricity Markets



Green-e Certification



- Voluntary certification and verification program run by non-profit, Center for Resource Solutions (CRS)
- Product requirements:
 - At least 50% Renewable
 - Balance must have lower air emissions
 - No specific purchases of nuclear power
 - Requirements for % New
- Code of Conduct and Annual Audit



Green-e Certified Competitive Renewable Power Suppliers

- **CT, NJ, TX** - Green Mountain Energy
- **Pennsylvania** - Energy Cooperative Association of Pennsylvania (ECAP), Green Mountain Energy, Mack Services
- **Mid-Atlantic** - Pepco Energy Services

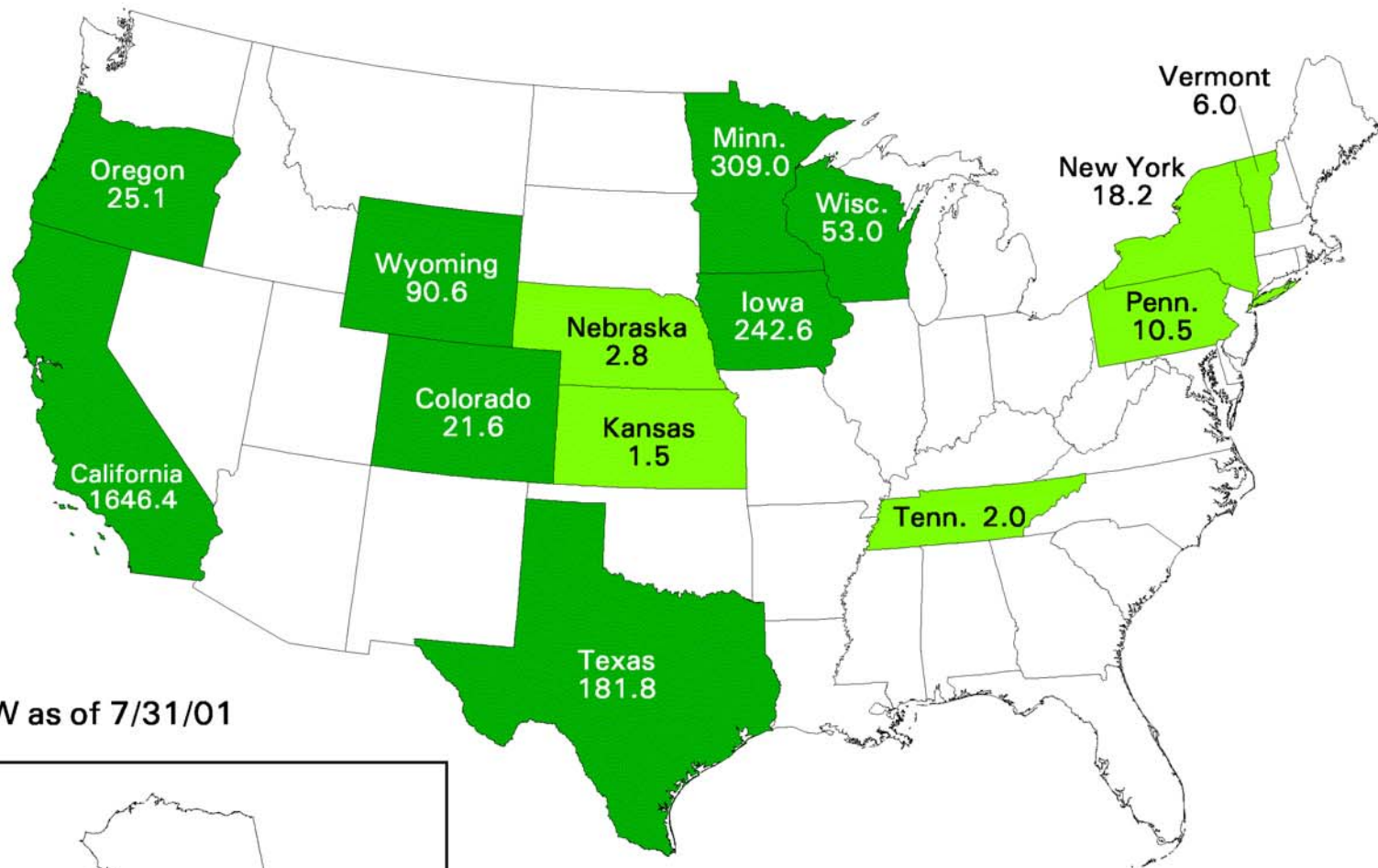


Green-e Certified TRC Suppliers

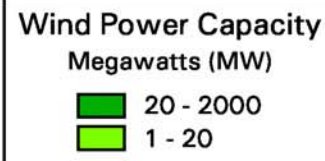
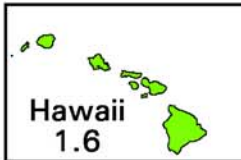
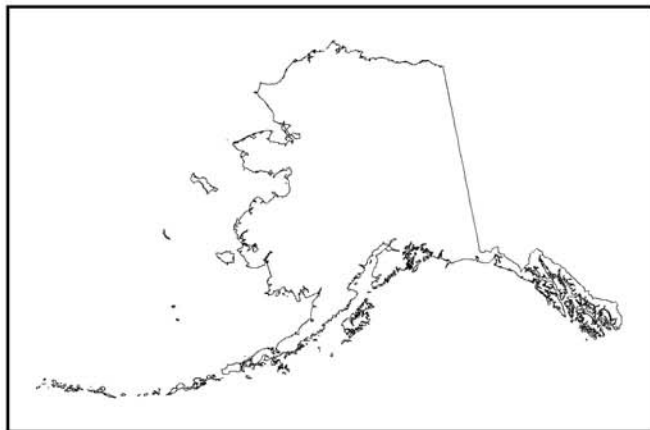
- Certification program available as of March 2002
- Six certified suppliers
 - Aquila (formerly Utilicorp)
 - Bonneville Environmental Foundation (BEF)
 - Community Energy
 - Renewable Choice Energy
 - Sterling Planet
 - Sun Power Electric



United States - Wind Power Capacity (MW)



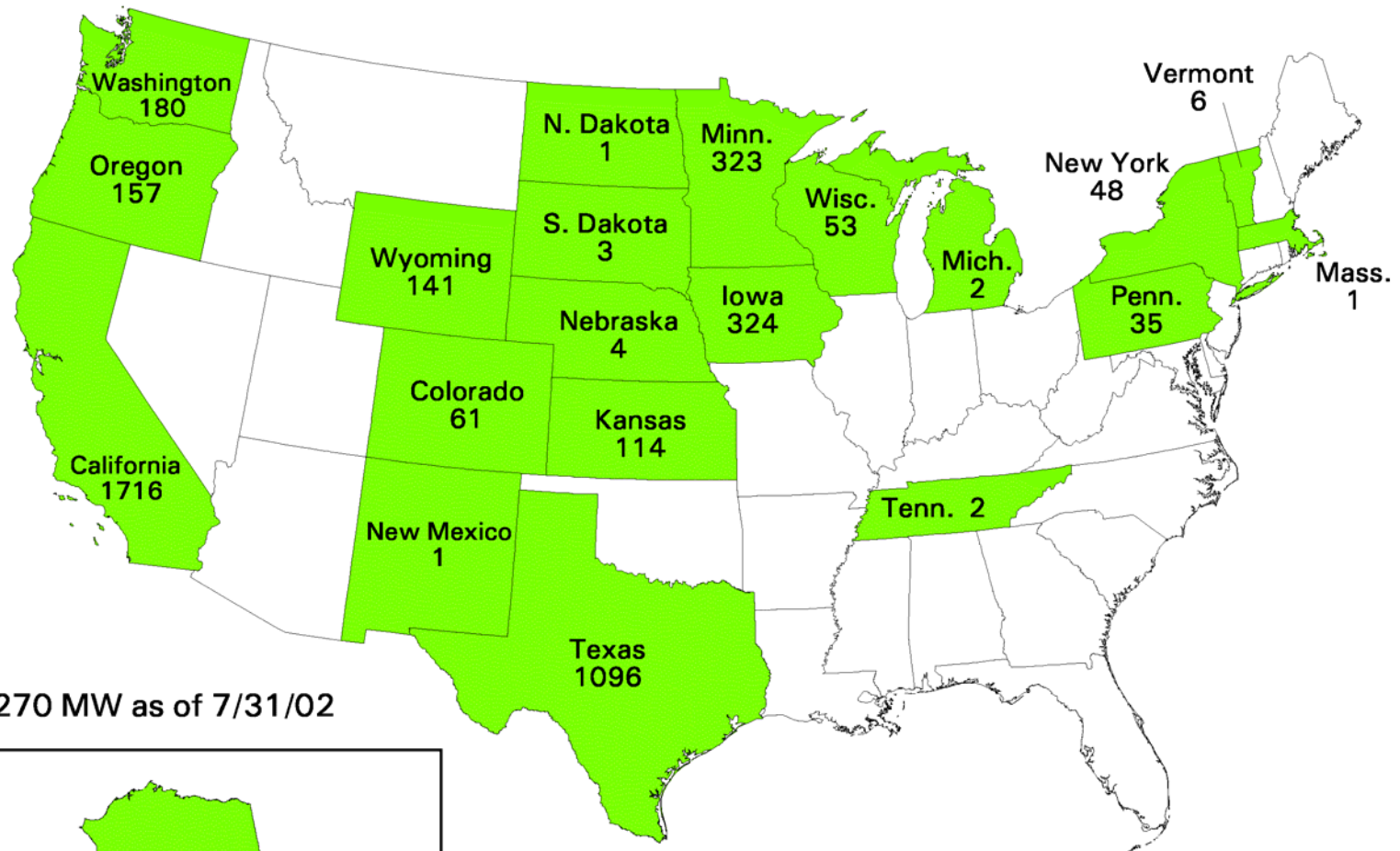
2,616 MW as of 7/31/01



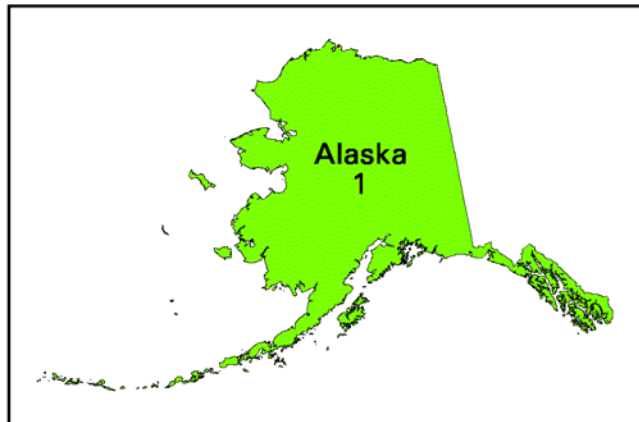
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United States - 2002 Wind Capacity (MW)



Total: 4,270 MW as of 7/31/02



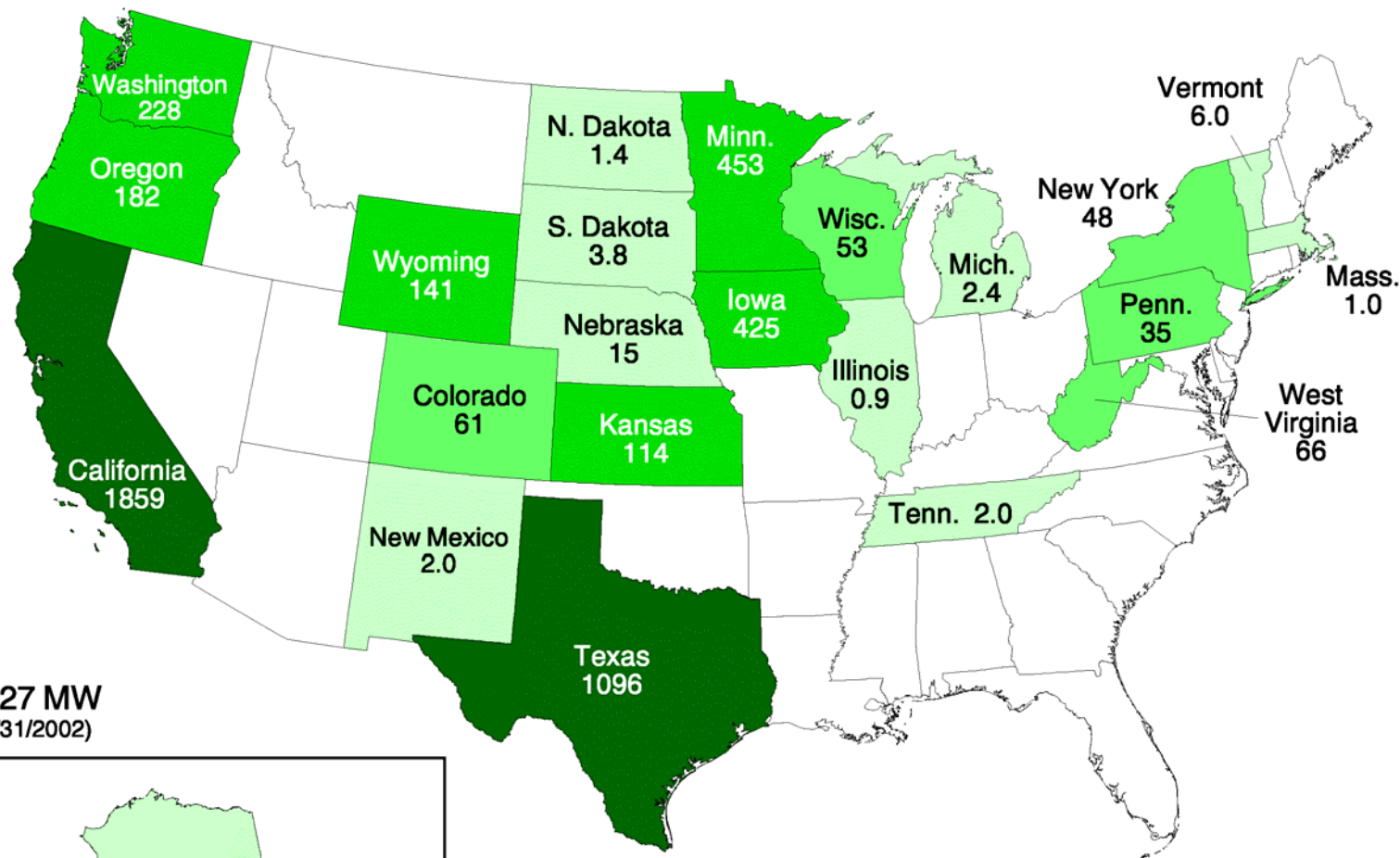
Wind Power Capacity
Megawatts (MW)
1 - 2000

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National Renewable Energy Laboratory

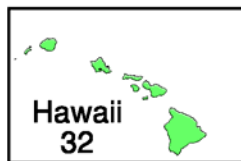
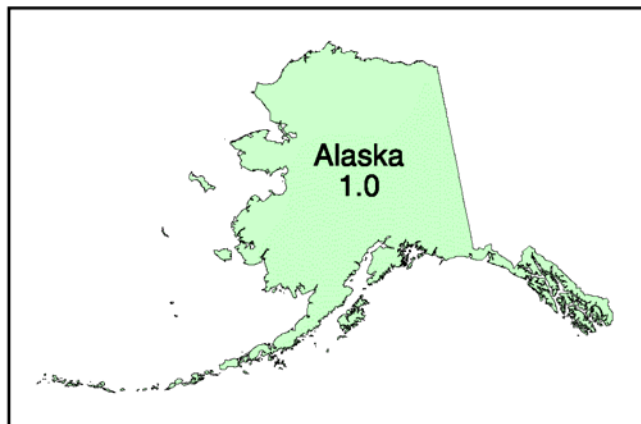


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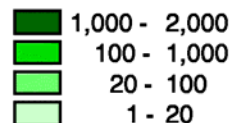
United States - 2002 Expected Year End Wind Power Capacity (MW)



Total: 4,827 MW
(Updated 07/31/2002)



Wind Power Capacity Megawatts (MW)



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Composite Wind Resource Map

NREL Updated Maps:

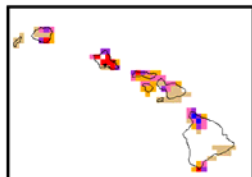
Idaho (2002)
Illinois (2001)
Montana (2002)
New Jersey (2002)
North Dakota (2000)
Oregon (2002)
Pennsylvania (2002)
South Dakota (2001)
Vermont (1999)
Washington (2002)
West Virginia (2002)
Wyoming (2002)

Other Updated Maps:

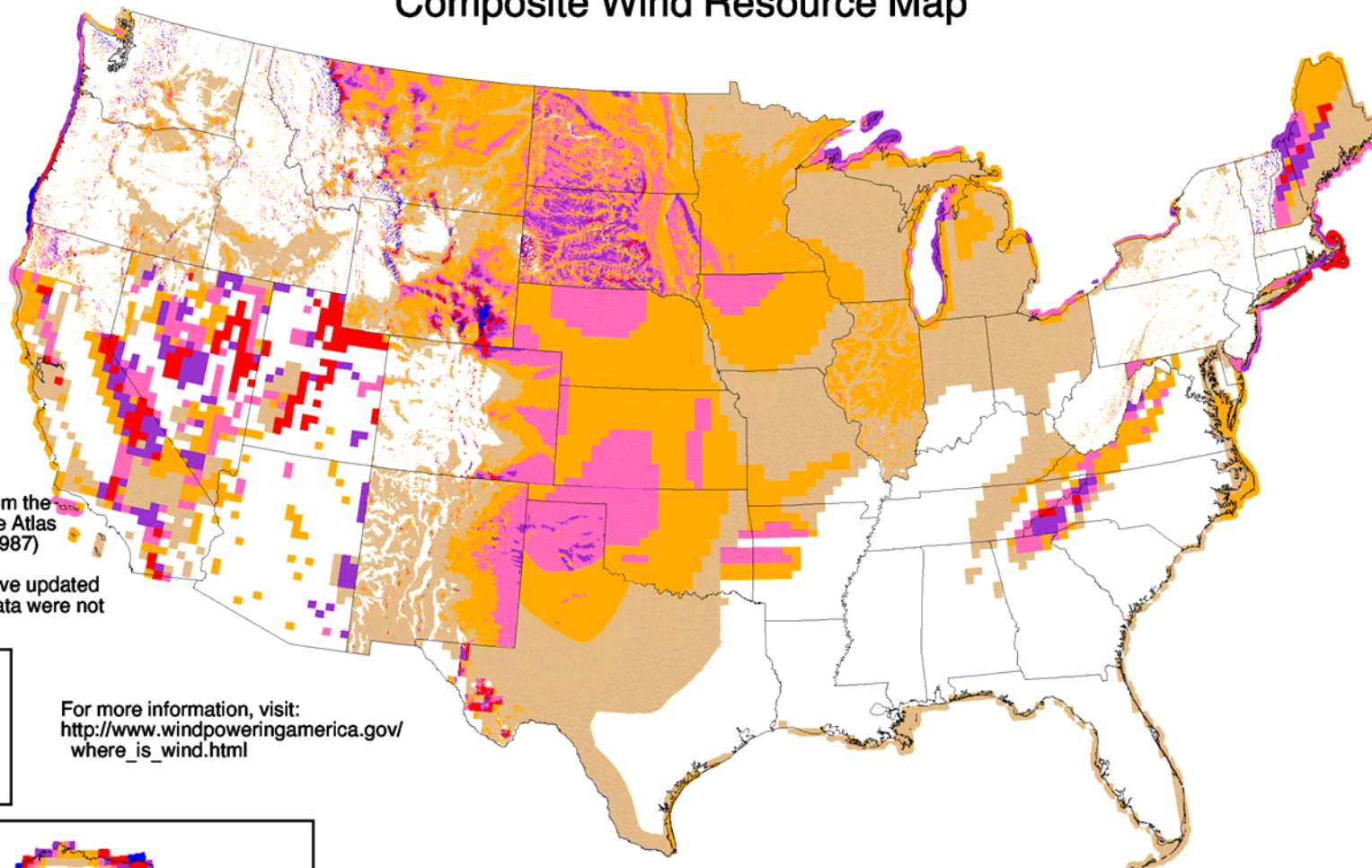
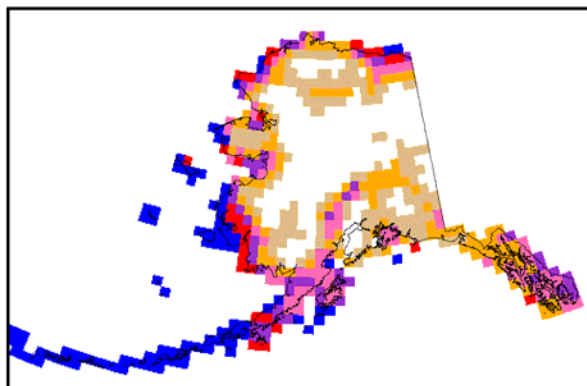
Colorado (1995)
Connecticut (2002)
Massachusetts (2002)
Minnesota (2000)
New Mexico (1997)
New York (2001)
Rhode Island (2002)
Texas (2001)

The other states are from the
"Wind Energy Resource Atlas
of the United States" (1987)

Iowa and Wisconsin have updated
assessments but the data were not
available for this map.



For more information, visit:
http://www.windpoweringamerica.gov/where_is_wind.html



Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m ²	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

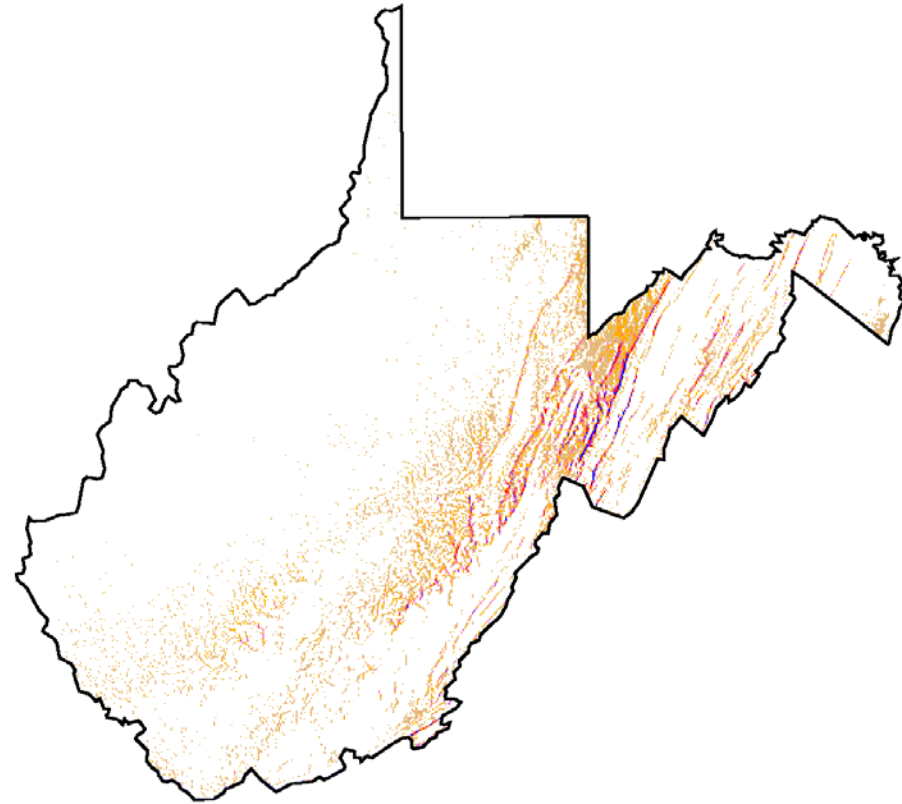
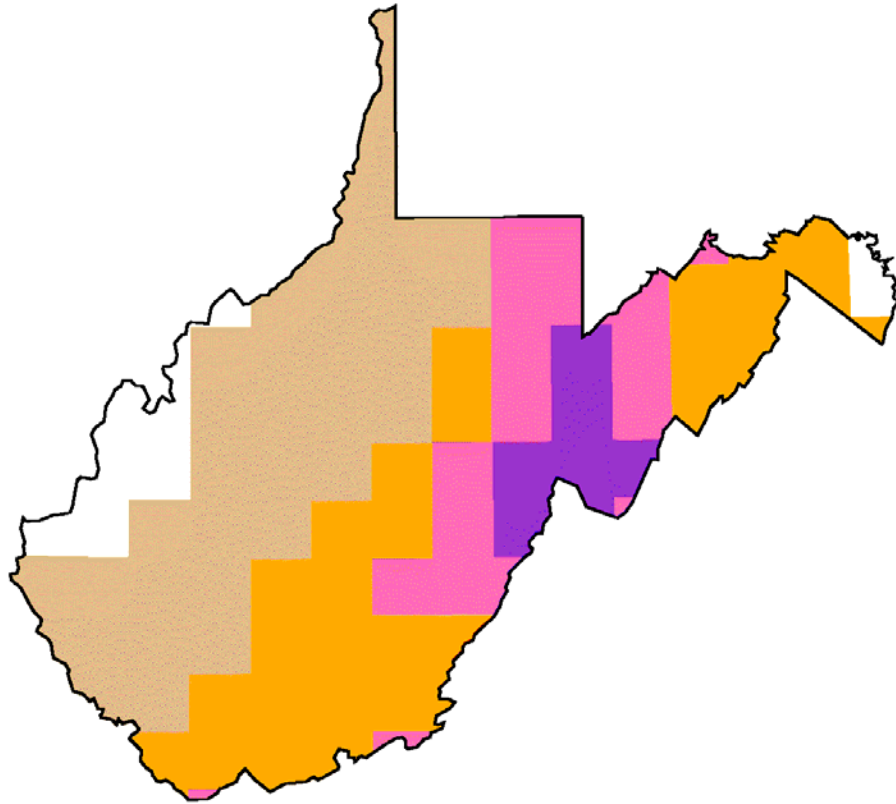
^aWind speeds are based on a Weibull k value of 2.0

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Resource Assessment – New Mapping



1987



"Treasure the Experience"

Federal Utility Partnership Working

Fall 2002

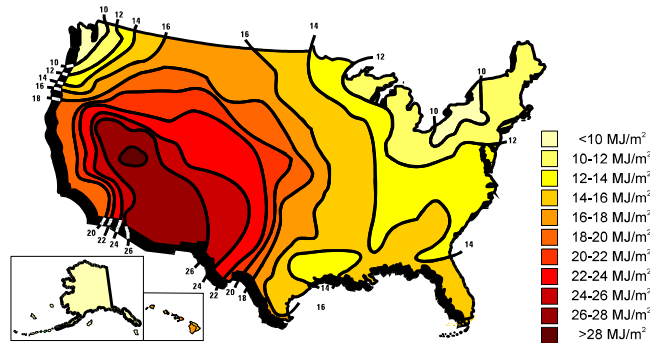
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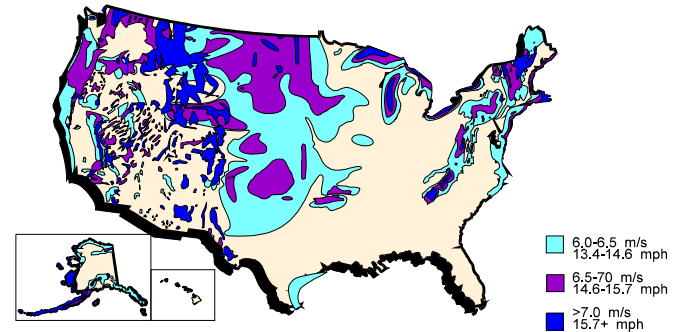
2002

U.S. Renewable Energy Resources

Solar



Wind





Web Sites

- **Purchasing Renewable Energy: A Guidebook for Federal Agencies**
<http://www.eren.doe.gov/femp/utility.html> *(Revision coming in 2003)*
- **EPA Green Power Partnership** - <http://www.epa.gov/greenpower/>
- **Green Power Network**- <http://www.eren.doe.gov/greenpower/home.shtml>
- **Green-e Certification** - <http://www.green-e.org>
- **Database of State Incentives for Renewable Energy (DSIRE)**
<http://www.dsireusa.org/>
- **Monthly Renewable Power Newsletter. Subscribe at**
<http://www.eren.doe.gov/greenpower/subscribe.shtml>



Renewable Power Purchasing Assistance

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